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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/855,322	05/14/2001	Baskaran Vijayakumar	PA1742US	1111

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EXAMINER	
BARAN, MARY C	
ART UNIT	PAPER NUMBER
2857	

DATE MAILED: 12/23/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Offic Action Summary	Applicati n No. 09/855,322	Applicant(s) VIJAYAKUMAR ET AL.
	Examiner Mary Kate B Baran	Art Unit 2857

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 April 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *7* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Oath/Declaration

1. All the inventors of the application have not signed the Oath/Declaration.

Specification

2. The disclosure is objected to because of the following informalities:

(a) Under the heading "Cross-References to Related Applications", Applicant fails to provide a serial number for the commonly assigned application.

(b) On page 10, paragraph [0037], the language "Finally." is not a complete sentence.

Appropriate correction is required.

3. The abstract of the disclosure is objected to because

(a) On page 18 line 8, the language "coarse sampling.. Subsequently" should be –coarse sampling. Subsequently—.

Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 4-7, 9, 12 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perry et al. (U.S. Patent No. 6,292,193) in view of Dickie (U.S. Patent No. 6,016,152).

Referring to claims 1, 9 and 19, Perry et al. teaches a method of texture filtering (see Perry et al., column 6 lines 10-15), comprising the steps of: receiving input information relating to polygon and texture data (see Perry et al., column 6 lines 2-9); and aggregating subsamples (see Perry et al., column 6 lines 20-25). Perry et al. does not teach morphing a texture reconstruction filter characteristic or an effective filter characteristic matches the texture reconstruction filter characteristic of a texture reconstruction filter used for coarse sampling.

Dickie discloses morphing a texture reconstruction filter characteristic (see Dickie, column 4 line 65 – column 5 line 4) and that an effective filter characteristic matches the texture reconstruction filter characteristic of a texture reconstruction filter used for coarse sampling (see Dickie, column 4 line 65 – column 5 line 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Perry et al. to include the teachings of Dickie because morphing filters allows the skilled artisan to reduce artifacts caused by resampling (see Dickie, column 2 lines 45-48).

Referring to claim 4, Perry et al. further teaches the effective filter characteristic matches the characteristic of a bilinear filter (see Perry et al., column 8 lines 38-55).

Referring to claim 5, Dickie further teaches the effective filter characteristic matches the characteristic of a combination of a bilinear filter and a box filter (see Dickie, column 5 lines 26-32 and column 4 line 65 – column 5 line 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Perry et al. to include the teachings of Dickie because using both bilinear filters and box filters as a reconstruction filter allows the skilled artisan to reduce artifacts caused by resampling (see Dickie, column 2 lines 45-48).

Referring to claim 6, Perry et al. further teaches the effective filter characteristic matches the characteristic of a combination of a linear filter between MIP levels (see Perry et al., column 8 lines 38-55) but does not teach and a combination of a bilinear filter and a box filter.

Dickie further discloses a combination of a bilinear filter and a box filter (see Dickie, column 5 lines 26-32).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Perry et al. to include the teachings of Dickie because linear filters, bilinear filters and box filters reduce artifacts caused by resampling (see Dickie, column 2 lines 45-48).

Referring to claims 7 and 12, Dickie further discloses the morphing of the texture reconstruction filter characteristic (see Dickie, column 4 line 65 – column 5 line 4) performed in a continuous manner (see Dickie, column 4 lines 22-25).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Perry et al. to include the teachings of Dickie, because continuous reconstruction filtering allows the skilled artisan to reduce artifacts in continuously presented images (see Dickie, column 2 lines 45-48).

5. Claims 2, 3, 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perry et al. (U.S. Patent No. 6,292,193) in view of Dickie (U.S. Patent No. 6,016,152) and in further view of Waters et al. (U.S. Patent No. 6,359,619).

Referring to claims 2 and 10, Perry et al. and Dickie teach all the features of the claimed invention except for input information relating to a rate of sampling of the polygon data.

Waters et al. teaches input information relating to a rate of sampling of the polygon data (see Waters et al., column 9 lines 34-46 and lines 59-63).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Perry et al. and Dickie to include the teachings of Waters et al., because compiling information pertaining to the sampling rate allows the skilled artisan to maintain an efficient representation of the image (see Waters et al., column 9 lines 44-46).

Referring to claims 3 and 11, Perry et al. and Dickie teach all the features of the claimed invention except for input information relating to a degree of warping per texture coordinate.

Waters et al. teaches input information relating to a degree of warping per texture coordinate (see Waters et al., column 5 lines 3-8).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Perry et al. and Dickie to include the teachings of Waters et al., because information pertaining to the warping allows the skilled artisan to perform a more efficient computation (see Waters et al., column 5 lines 8-11).

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Perry et al. (U.S. Patent No. 6,292,193), in view of Dickie (U.S. Patent No. 6,016,152), in further view of Waters et al. (U.S. Patent No. 6,359,619), and in further view of "Programming Assignment #5: Beier-Neely Morphing" (herein Beier-Neely).

Referring to claim 8, Dickie further teaches the morphing of the texture reconstruction filter characteristic (see Dickie, column 4 line 65 – column 5 line 4) but does not teach a value $\beta = \min(\delta*(n-1/n,1.0))$ wherein δ is a degree of warping per texture coordinate and n is a sampling rate of the polygon data.

Beier-Neely teaches a value $\beta = \min(\delta*(n-1/n,1.0))$ (see Beier-Neely, page 7, "Multiple-image mode").

Waters et al. teaches a degree of warping per texture coordinate (see Waters et al., column 5 lines 3-8) and a sampling rate of the polygon data (see Waters et al., column 9 lines 34-46 and lines 59-63).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Perry et al. to include the teachings of Dickie, because morphing

the reconstruction filter allows the skilled artisan to reduce artifacts in continuously presented images (see Dickie, column 2 lines 45-48), to further include the teachings of Beier-Neely, because this value provides a warp fraction which aids the skilled artisan in morphing between two images (see Beier-Neely, page 1, "Part II: The Beier-Neely Algorithm"), and to further include the teachings of Waters et al. because, compiling information pertaining to the sampling rate allows the skilled artisan to maintain an efficient representation of the image (see Waters et al., column 9 lines 44-46).

7. Claims 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Waters et al. (U.S. Patent No. 6,359,619), in view of Cosman (U.S. Patent No. 5,734,386).

Referring to claim 13, Waters et al. teaches an apparatus for texture filtering, comprising: a first module adapted to detect a sampling rate n of polygon data (see Waters et al., column 9 lines 34-46 and lines 59-63); and a second module coupled to the first module adapted to select a filtering mode based upon a sampling rate n of polygon data (see Waters et al., column 9 lines 34-46 and lines 59-63) and a degree of warping δ per texture coordinate (see Waters et al., column 5 lines 3-8). Waters et al. does not teach a third module coupled to the second module adapted to compute texel blending factors based on the filtering mode determined by the second module.

Cosman teaches a module coupled to the second module adapted to compute texel blending factors based on the filtering mode determined by the second module (see Cosman, column 5 lines 1-23).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Waters et al. to include the teachings of Cosman because computing the texel blending factors allows the skilled artisan to obtain a better quality image (see Cosman, column 3 lines 59-62).

Referring to claim 15, Waters et al. further teaches a fourth module coupled to the third module adapted to detect a degree of warping δ per texture coordinate (see Waters et al., column 5 lines 3-8).

8. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Waters et al. (U.S. Patent No. 6,359,619), in view of Cosman (U.S. Patent No. 5,734,386), and further in view of Dickie (U.S. Patent No. 6,016,152).

Referring to claim 16, Water et al. teaches a filter select module adapted to select a filtering mode based upon a sampling rate n of polygon data (see Waters et al., column 9 lines 34-46 and lines 59-63). Waters et al. does not teach and a texel blending module coupled to the filter select module adapted to compute texel blending factors based on the filtering mode determined by the filter select module.

Cosman teaches a texel blending module coupled to the filter select module adapted to compute texel blending factors (see Cosman, column 5 lines 1-23).

Dickie teaches a filtering mode determined by the filter select module (see Dickie, column 4 line 65 – column 5 line 4).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Waters et al. to include the teachings of Cosman because computing the texel blending factors allows the skilled artisan to obtain a better quality image (see Cosman, column 3 lines 59-62), and to further include the teachings of Dickie because, selecting filters allows the skilled artisan to reduce artifacts caused by resampling (see Dickie, column 2 lines 45-48).

Referring to claim 17, Waters further teaches a sampling rate n (see Waters et al., column 9 lines 34-46 and lines 59-63) and a degree of warping δ per texture coordinate (see Waters et al., column 5 lines 3-8), but does not teach a filter select module.

Dickie teaches a filter select module (see Dickie, column 4 line 65 – column 5 line 4).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Waters et al. and to include the teachings of Dickie because, selecting filters allows the skilled artisan to reduce artifacts caused by resampling (see Dickie, column 2 lines 45-48).

9. Claims 14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Waters et al. (U.S. Patent No. 6,359,619), in view of Cosman (U.S. Patent No. 5,734,386), in further view of Dickie (U.S. Patent No. 6,016,152), and further in view of Beier-Neely.

Referring to claim 14, Waters et al. and Cosman teach all the features of the claimed invention except for a second module selects a filtering mode based upon a value $\beta = \min(\delta^*(n-1/n,1.0))$.

Dickie teaches a module selecting a filtering mode (see Dickie, column 4 line 65 – column 5 line 4).

Beier-Neely teaches a value $\beta = \min(\delta^*(n-1/n,1.0))$ (see Beier-Neely, page 7, "Multiple-image mode").

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Waters et al. and Cosman to include the teachings of Dickie, because selecting a filter allows the skilled artisan to reduce artifacts in continuously presented images (see Dickie, column 2 lines 45-48), and to further include the teachings of Beier-Neely, because this value allows the skilled artisan to morph between two images (see Beier-Neely, page 1, "Part II: The Beier-Neely Algorithm").

Referring to claim 18, Waters et al., Cosman and Dickie teach all the features of the claimed invention except for a value $\beta = \min(\delta^*(n-1/n,1.0))$.

Beier-Neely teaches a value $\beta = \min(\delta^*(n-1/n,1.0))$ (see Beier-Neely, page 7, "Multiple-image mode").

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Waters et al., Cosman, and Dickie to include the teachings of Beier-Neely because this value allows the skilled artisan to morph between two images (see Beier-Neely, page 1, "Part II: The Beier-Neely Algorithm").

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(a) Martin et al. teaches methods and apparatus for embedding 2D image content into 3D models.

(b) Azarbayejani et al. teaches a method an apparatus for three-dimensional, textured models from plural video images.

(c) Lengyel et al. teaches a method for measuring the fidelity of warped image layer approximations in a real-time graphics rendering pipeline.

(d) Tarolli et al. teaches level of detail texture filtering with dithering and mipmaps and a texture compositing apparatus and method.

(e) Iourcha et al teaches trilinear texture filtering of two levels of detail based on a single level of detail.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary Kate B Baran whose telephone number is (703) 305-4474. The examiner can normally be reached on Monday - Friday from 8:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S Hoff can be reached on (703) 308-1677. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

MKB
November 26, 2002

MARC S. HOFF
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